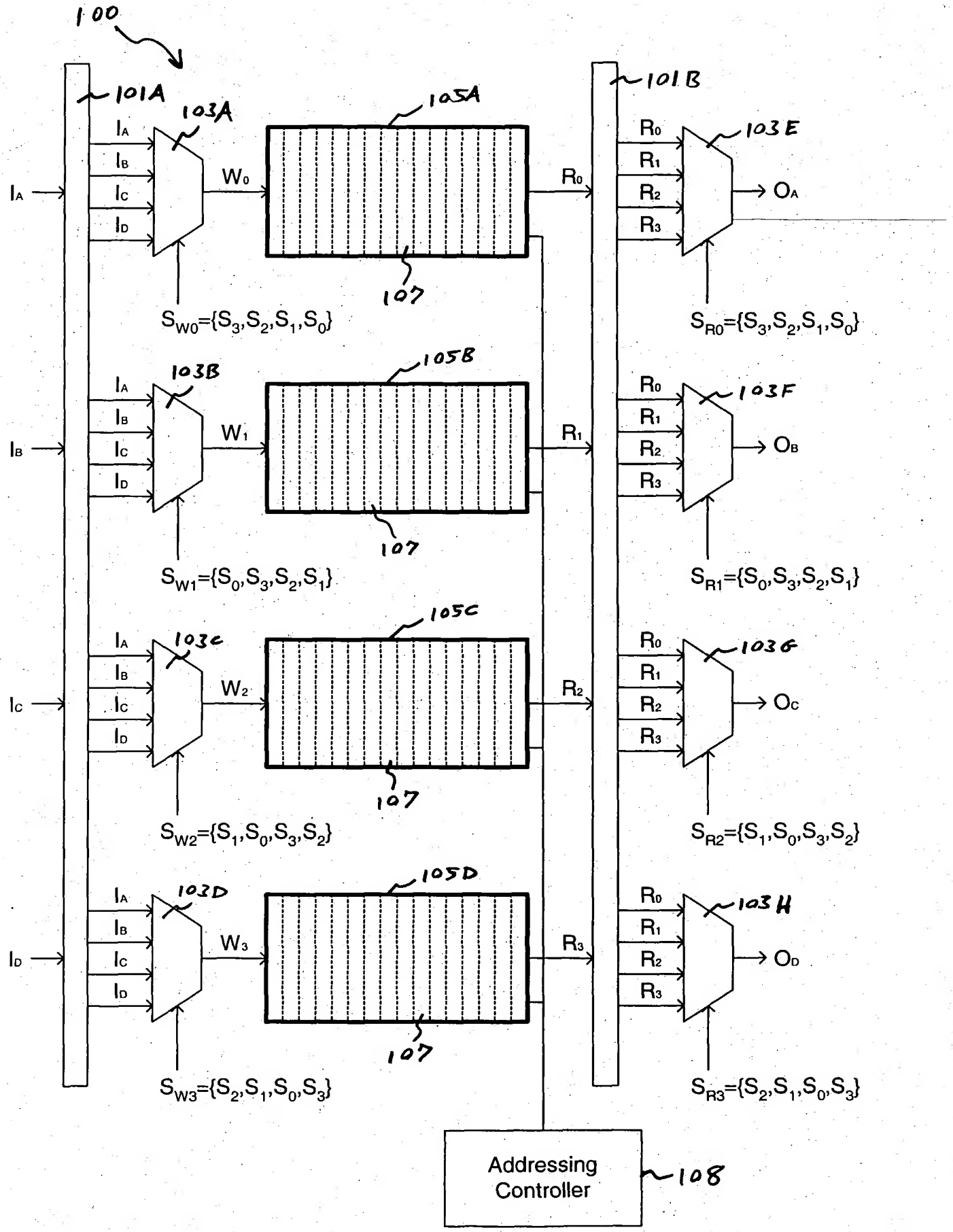
100
101A
101B
103A
103B
103C
103D
103E
103F
103G
103H
105A
105B
105C
105D
107
108
I_A
I_B
I_C
I_D
W_0
W_1
W_2
W_3
R_0
R_1
R_2
R_3
O_A
O_B
O_C
O_D
$S_{W0}=\{S_3,S_2,S_1,S_0\}$
$S_{W1}=\{S_0,S_3,S_2,S_1\}$
$S_{W2}=\{S_1,S_0,S_3,S_2\}$
$S_{W3}=\{S_2,S_1,S_0,S_3\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}$
Addressing Controller

Fig. 1

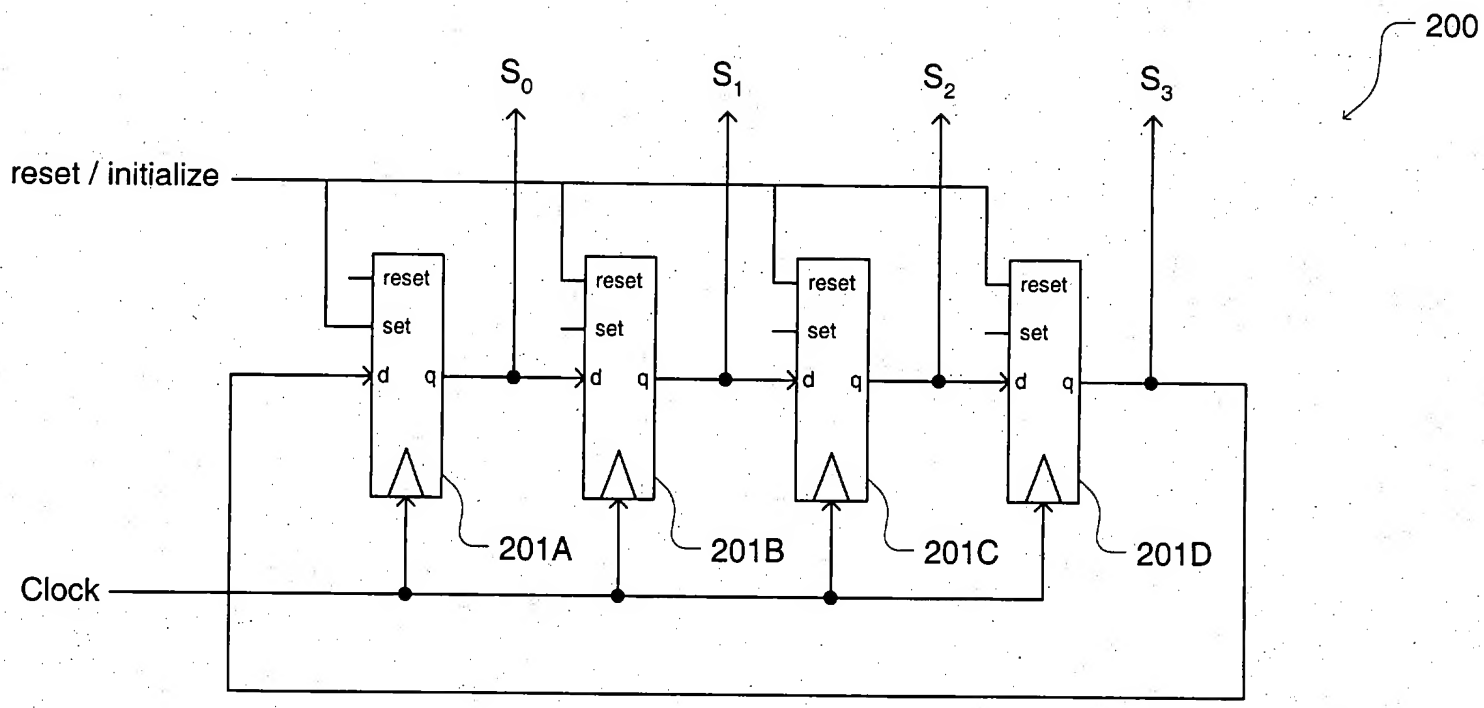
200
S_0
S_1
S_2
S_3
reset / initialize
reset
set
d
q
201A
201B
201C
201D
Clock

Fig. 2

	Clock Cycle									
	0	1	2	3	4	5	6	7	8	9
S_0	1	0	0	0	1	0	0	0	1	0
S_1	0	1	0	0	0	1	0	0	0	1
S_2	0	0	1	0	0	0	1	0	0	0
S_3	0	0	0	1	0	0	0	1	0	0
S_{W0}/S_{R0}	{0001}	{0010}	{0100}	{1000}	{0001}	{0010}	{0100}	{1000}	{0001}	{0010}
S_{W1}/S_{R1}	{1000}	{0001}	{0010}	{0100}	{1000}	{0001}	{0010}	{0100}	{1000}	{0001}
S_{W2}/S_{R2}	{0100}	{1000}	{0001}	{0010}	{0100}	{1000}	{0001}	{0010}	{0100}	{1000}
S_{W3}/S_{R3}	{0010}	{0100}	{1000}	{0001}	{0010}	{0100}	{1000}	{0001}	{0010}	{0100}

Fig. 3

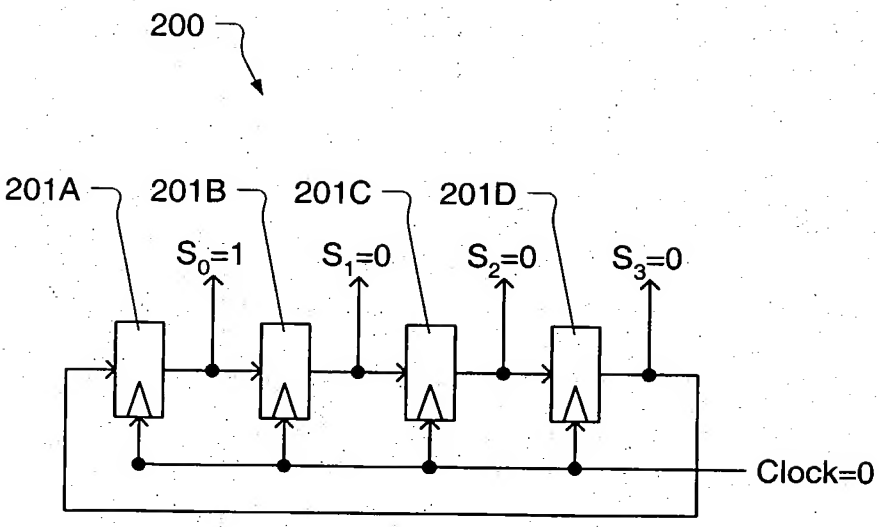

Fig. 4A

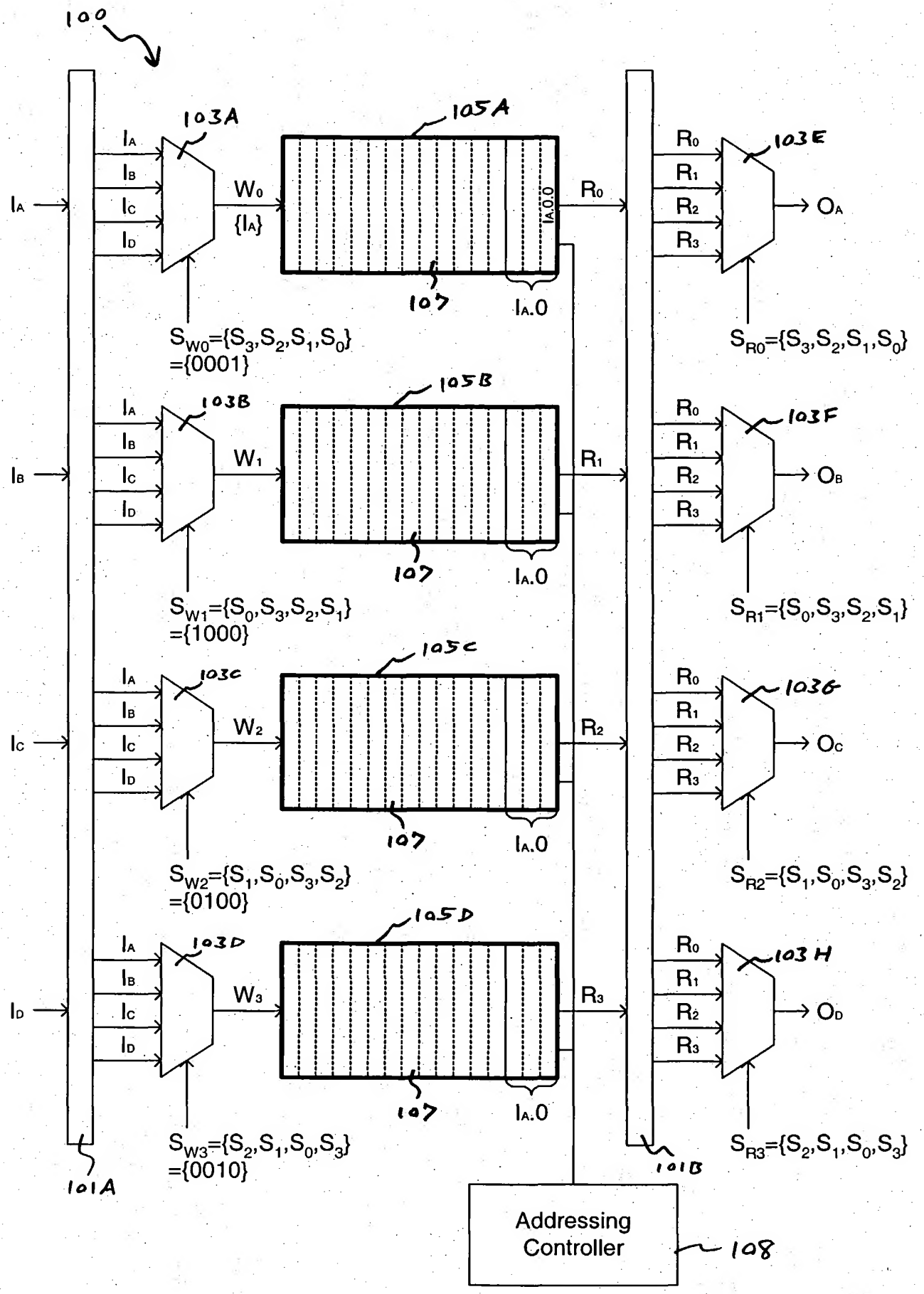
100
103A
105A
I_A
I_B
I_C
I_D
W_0
{I_A}
$I_{A.0.0}$
R_0
107
$I_A.0$
S_{W0}={S_3,S_2,S_1,S_0}
={0001}
103E
R_0
R_1
R_2
R_3
O_A
S_{R0}={S_3,S_2,S_1,S_0}
103B
105B
W_1
R_1
S_{W1}={S_0,S_3,S_2,S_1}
={1000}
103F
O_B
S_{R1}={S_0,S_3,S_2,S_1}
103C
105C
W_2
R_2
S_{W2}={S_1,S_0,S_3,S_2}
={0100}
103G
O_C
S_{R2}={S_1,S_0,S_3,S_2}
103D
105D
W_3
R_3
S_{W3}={S_2,S_1,S_0,S_3}
={0010}
103H
O_D
S_{R3}={S_2,S_1,S_0,S_3}
101A
101B
Addressing Controller
108

Fig. 4B

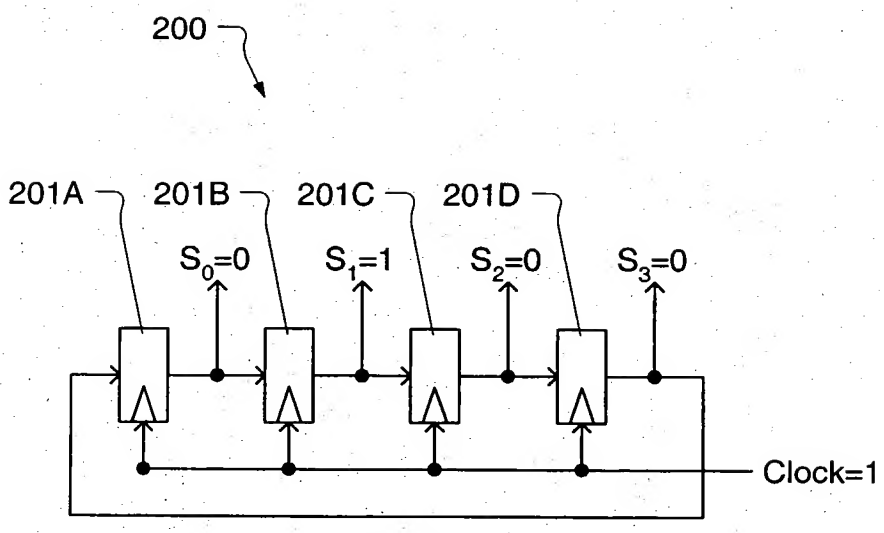

Fig. 5A

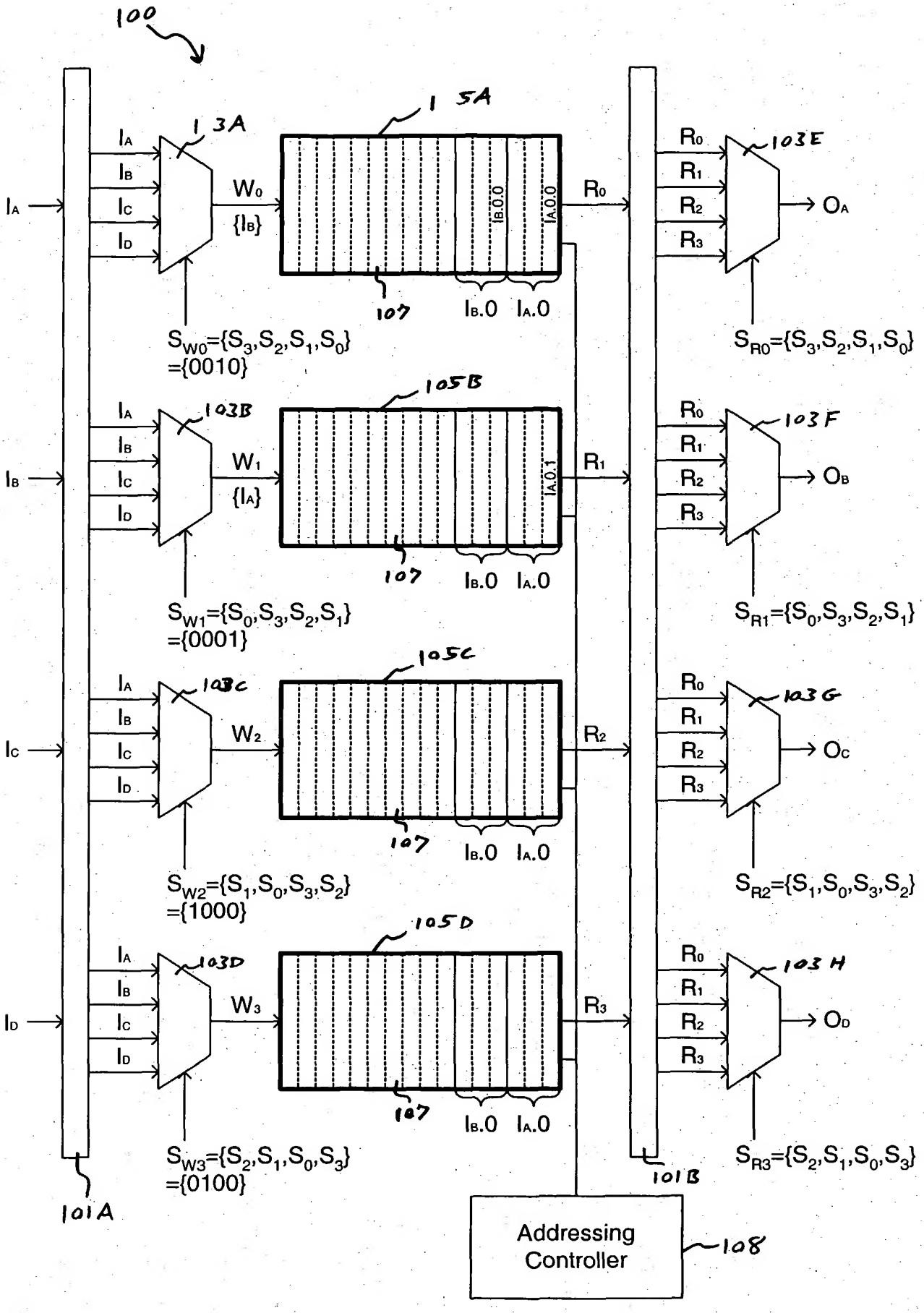
100
105A
103A
I_A
I_B
I_C
I_D
W_0
$\{I_B\}$
$I_{B.0.0}$
$I_{A.0.0}$
R_0
107
$I_{B.0}$
$I_{A.0}$
$S_{W0}=\{S_3,S_2,S_1,S_0\}$
$=\{0010\}$
103E
R_1
R_2
R_3
O_A
$S_{R0}=\{S_3,S_2,S_1,S_0\}$
105B
103B
W_1
$\{I_A\}$
$I_{A.0.1}$
R_1
$S_{W1}=\{S_0,S_3,S_2,S_1\}$
$=\{0001\}$
103F
O_B
$S_{R1}=\{S_0,S_3,S_2,S_1\}$
105C
103C
W_2
R_2
$S_{W2}=\{S_1,S_0,S_3,S_2\}$
$=\{1000\}$
103G
O_C
$S_{R2}=\{S_1,S_0,S_3,S_2\}$
105D
103D
W_3
R_3
$S_{W3}=\{S_2,S_1,S_0,S_3\}$
$=\{0100\}$
103H
O_D
$S_{R3}=\{S_2,S_1,S_0,S_3\}$
101A
101B
Addressing Controller
108

Fig. 5B

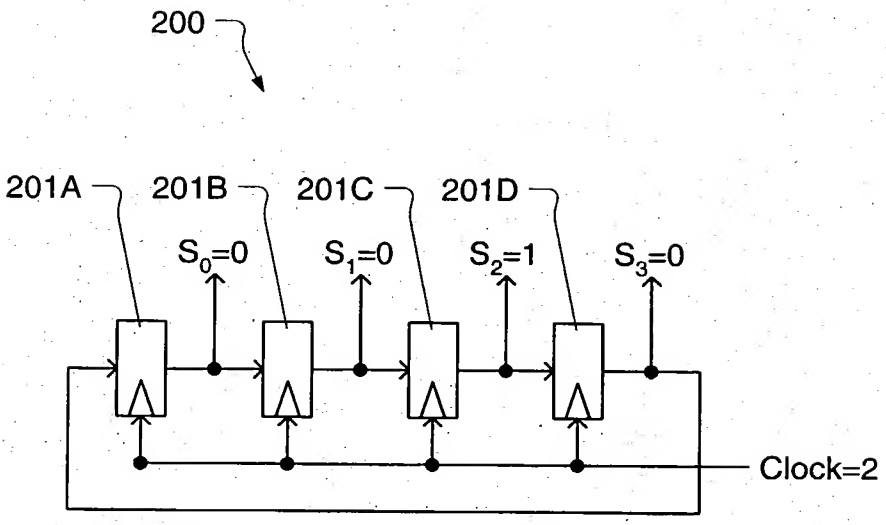

Fig. 6A

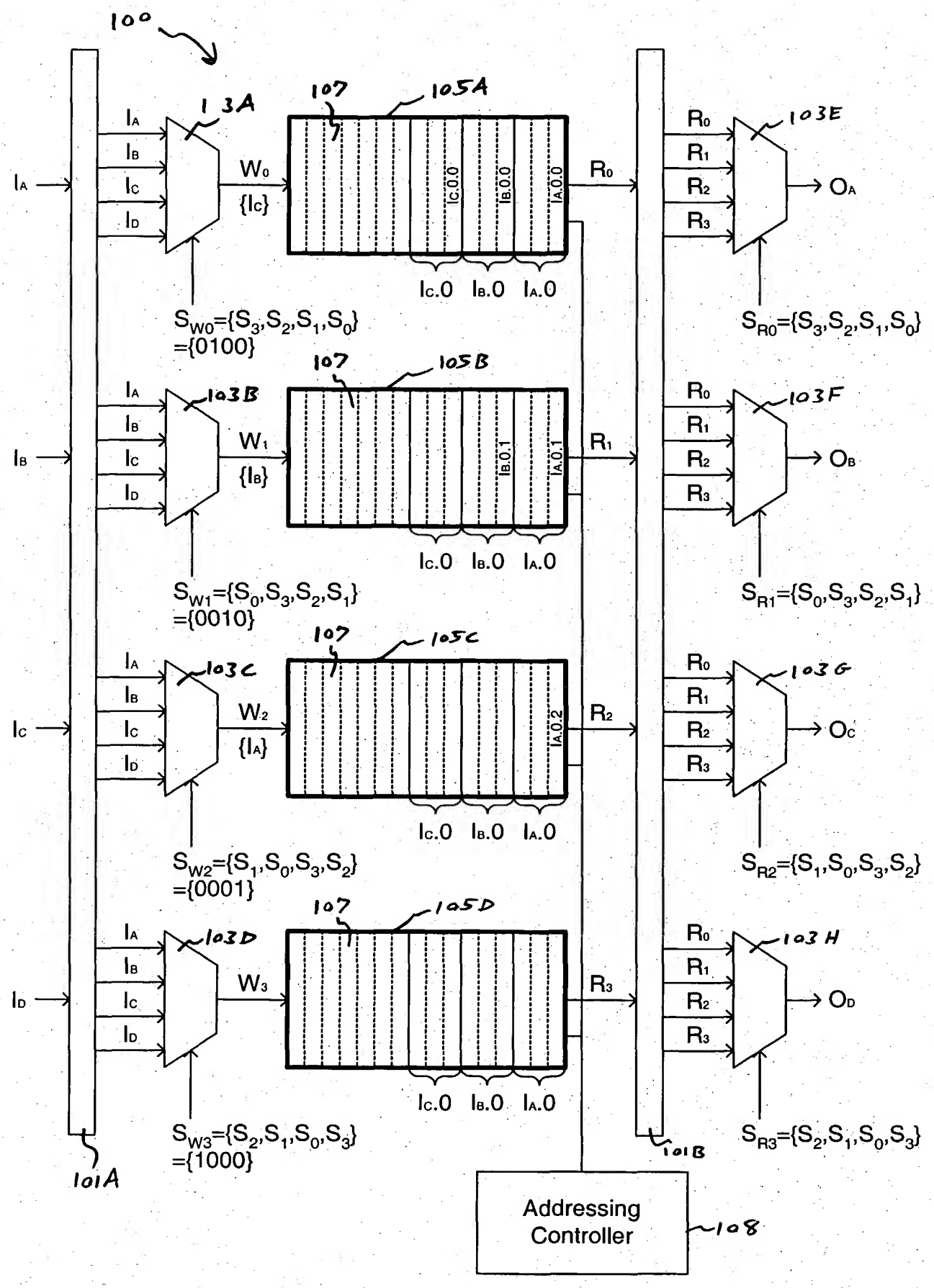
100
103A
107
105A
I_A
I_B
I_C
I_D
W_0
{I_C}
$I_{C.0.0}$
$I_{B.0.0}$
$I_{A.0.0}$
R_0
$I_{C.0}$ $I_{B.0}$ $I_{A.0}$
S_{W0}={S_3,S_2,S_1,S_0}
={0100}
103E
R_0
R_1
R_2
R_3
O_A
S_{R0}={S_3,S_2,S_1,S_0}
103B
105B
W_1
{I_B}
$I_{B.0.1}$
$I_{A.0.1}$
R_1
S_{W1}={S_0,S_3,S_2,S_1}
={0010}
103F
O_B
S_{R1}={S_0,S_3,S_2,S_1}
103C
105C
W_2
{I_A}
$I_{A.0.2}$
R_2
S_{W2}={S_1,S_0,S_3,S_2}
={0001}
103G
O_C
S_{R2}={S_1,S_0,S_3,S_2}
103D
105D
W_3
R_3
S_{W3}={S_2,S_1,S_0,S_3}
={1000}
103H
O_D
S_{R3}={S_2,S_1,S_0,S_3}
101A
101B
Addressing Controller
108

Fig. 6B

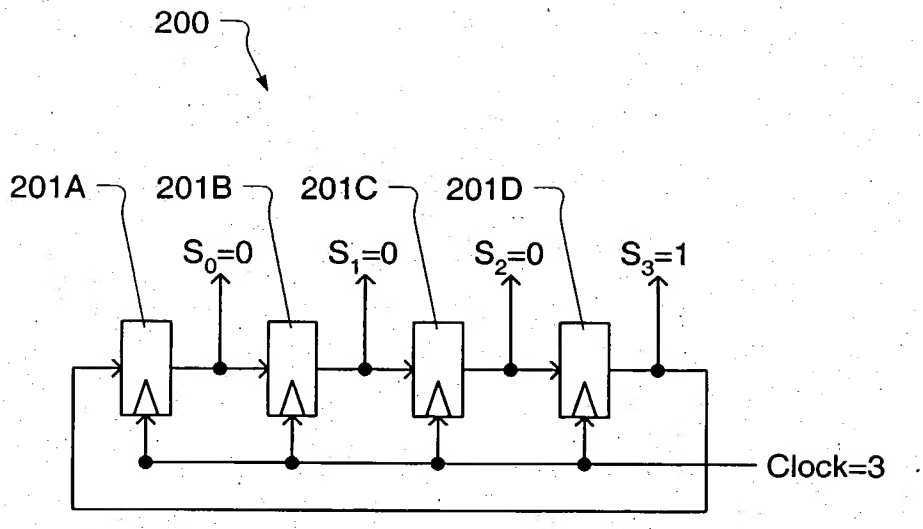

Fig. 7A

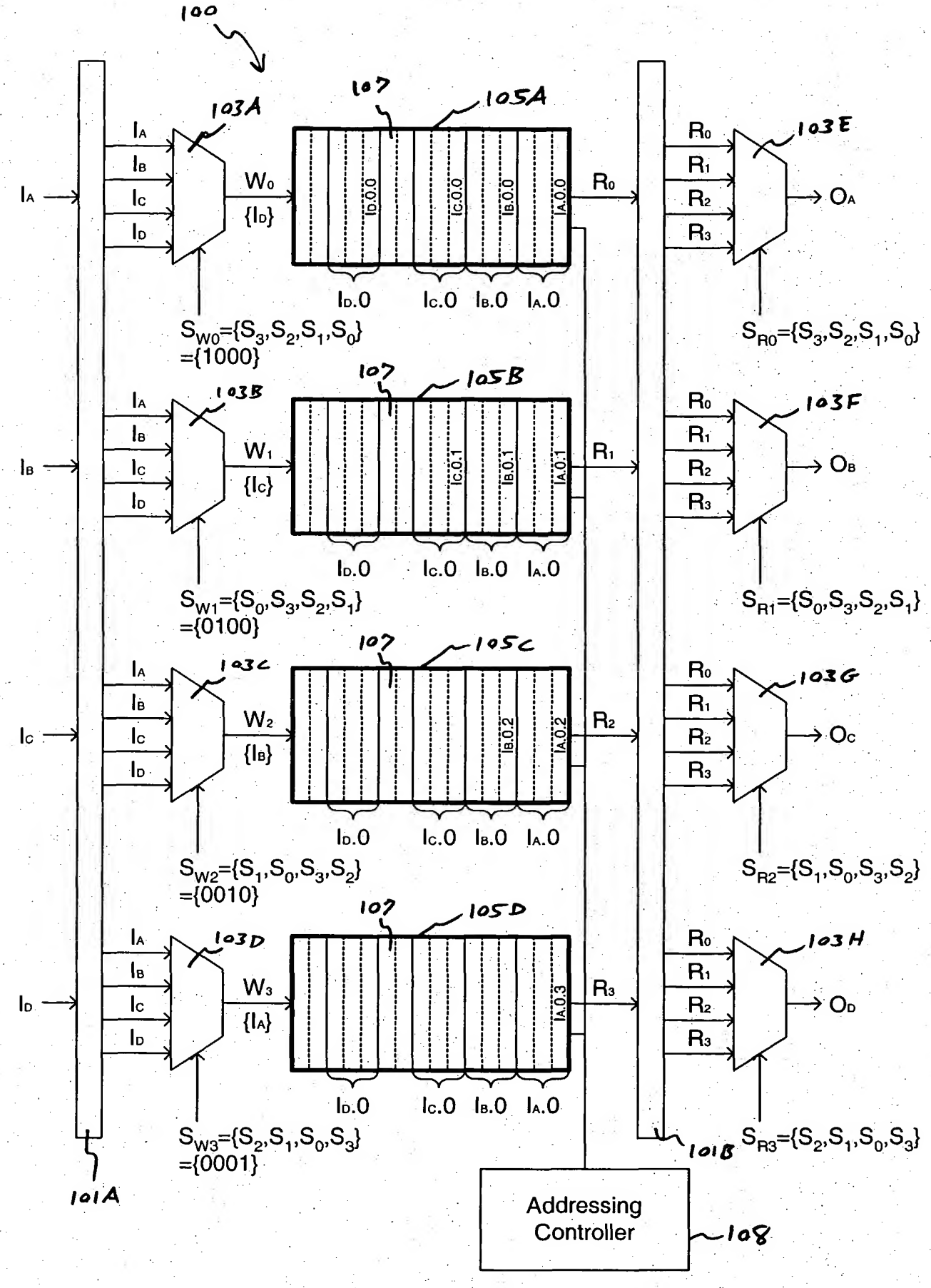
100
103A
107
105A
103E
I_A
I_B
I_C
I_D
W_0
$\{I_D\}$
$I_{D.0.0}$
$I_{C.0.0}$
$I_{B.0.0}$
$I_{A.0.0}$
R_0
R_1
R_2
R_3
O_A
$I_{D.0}$ $I_{C.0}$ $I_{B.0}$ $I_{A.0}$
$S_{W0}=\{S_3,S_2,S_1,S_0\}$
$=\{1000\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}$
103B
105B
103F
W_1
$\{I_C\}$
$I_{C.0.1}$
$I_{B.0.1}$
$I_{A.0.1}$
O_B
$S_{W1}=\{S_0,S_3,S_2,S_1\}$
$=\{0100\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}$
103C
105C
103G
W_2
$\{I_B\}$
$I_{B.0.2}$
$I_{A.0.2}$
O_C
$S_{W2}=\{S_1,S_0,S_3,S_2\}$
$=\{0010\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}$
103D
105D
103H
W_3
$\{I_A\}$
$I_{A.0.3}$
O_D
$S_{W3}=\{S_2,S_1,S_0,S_3\}$
$=\{0001\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}$
101A
101B
Addressing Controller
108

Fig. 7B

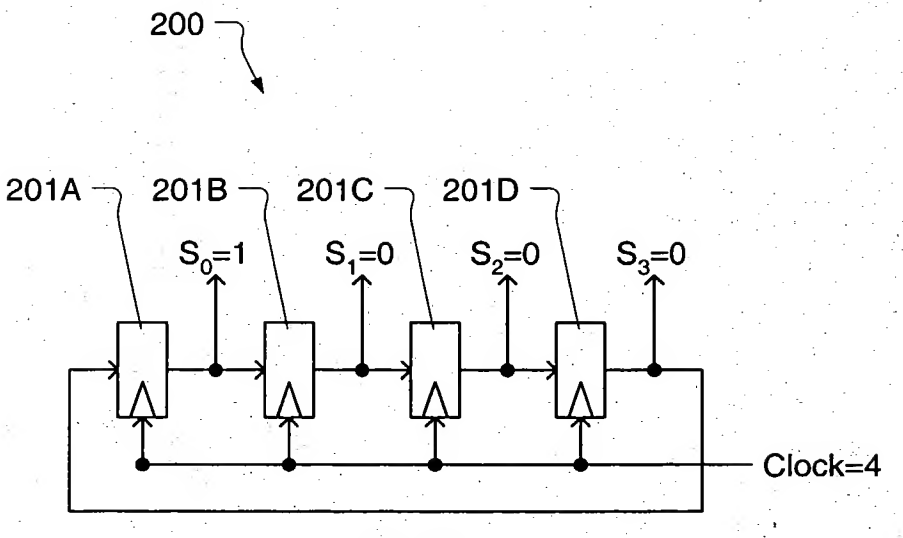

Fig. 8A

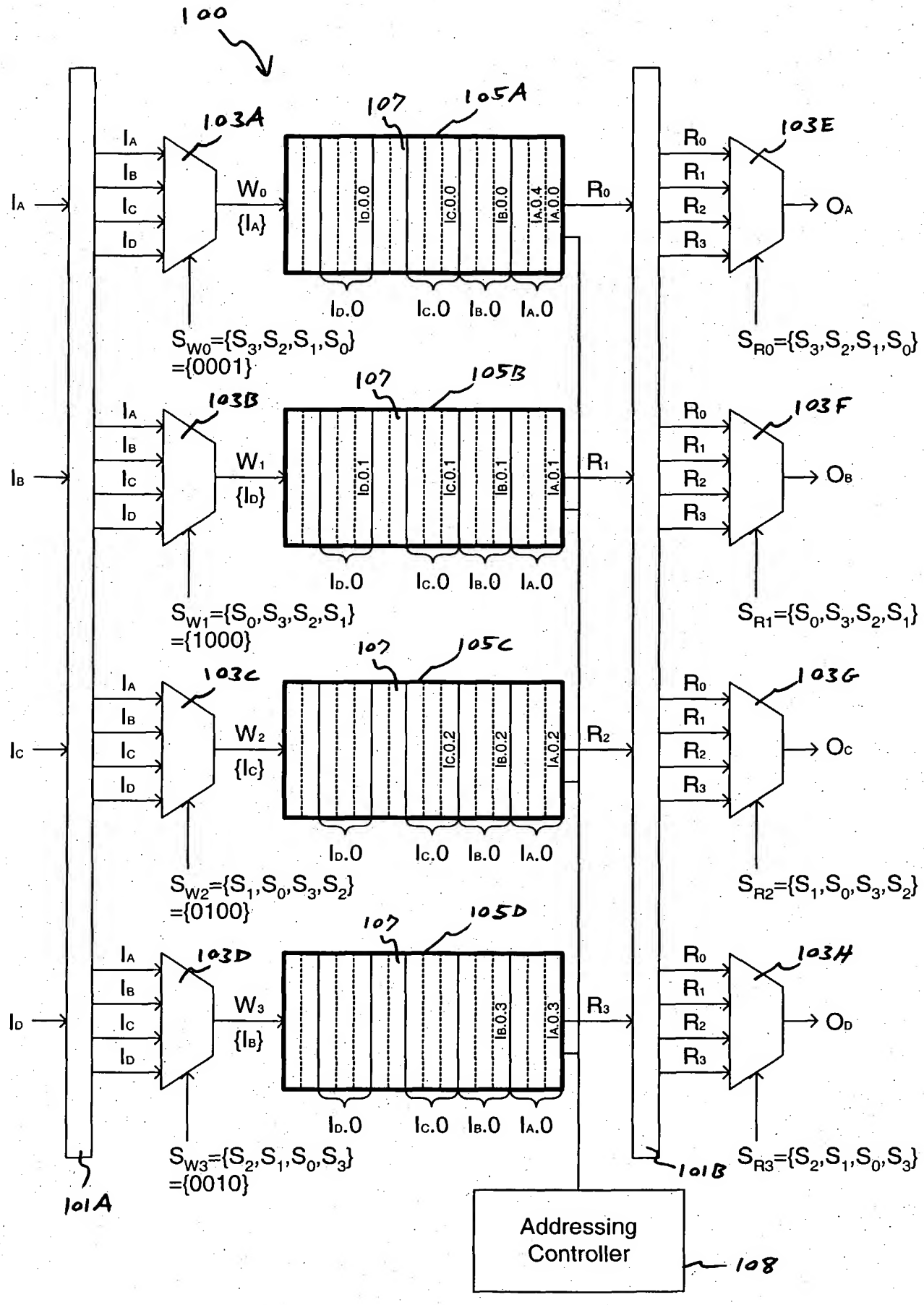
100
103A
105A
107
103E
103B
105B
103F
103C
105C
103G
103D
105D
103H
101A
101B
108
Addressing Controller
I_A
I_B
I_C
I_D
W_0 {I_A}
W_1 {I_D}
W_2 {I_C}
W_3 {I_B}
$I_D.0.0$ $I_C.0.0$ $I_B.0.0$ $I_A.0.4$ $I_A.0.0$
$I_D.0.1$ $I_C.0.1$ $I_B.0.1$ $I_A.0.1$
$I_C.0.2$ $I_B.0.2$ $I_A.0.2$
$I_B.0.3$ $I_A.0.3$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
R_0 R_1 R_2 R_3
O_A O_B O_C O_D
$S_{W0}=\{S_3,S_2,S_1,S_0\}=\{0001\}$
$S_{W1}=\{S_0,S_3,S_2,S_1\}=\{1000\}$
$S_{W2}=\{S_1,S_0,S_3,S_2\}=\{0100\}$
$S_{W3}=\{S_2,S_1,S_0,S_3\}=\{0010\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}$

Fig. 8B

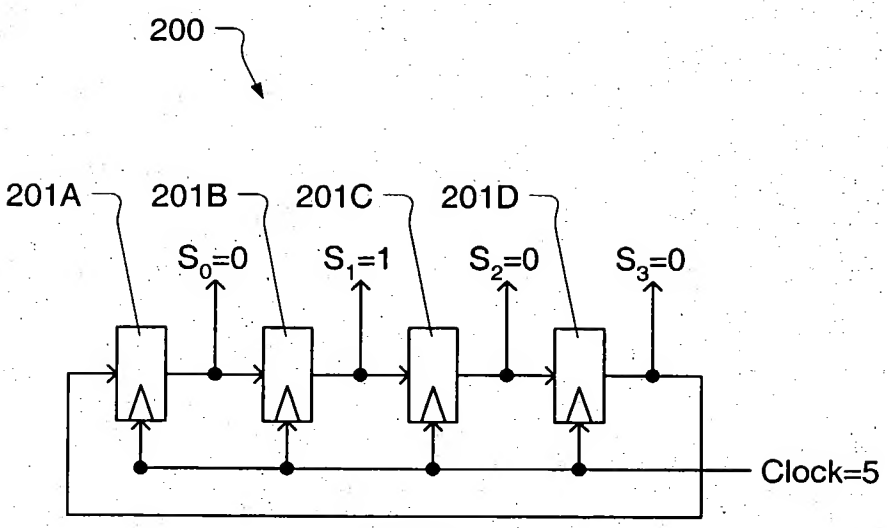

Fig. 9A

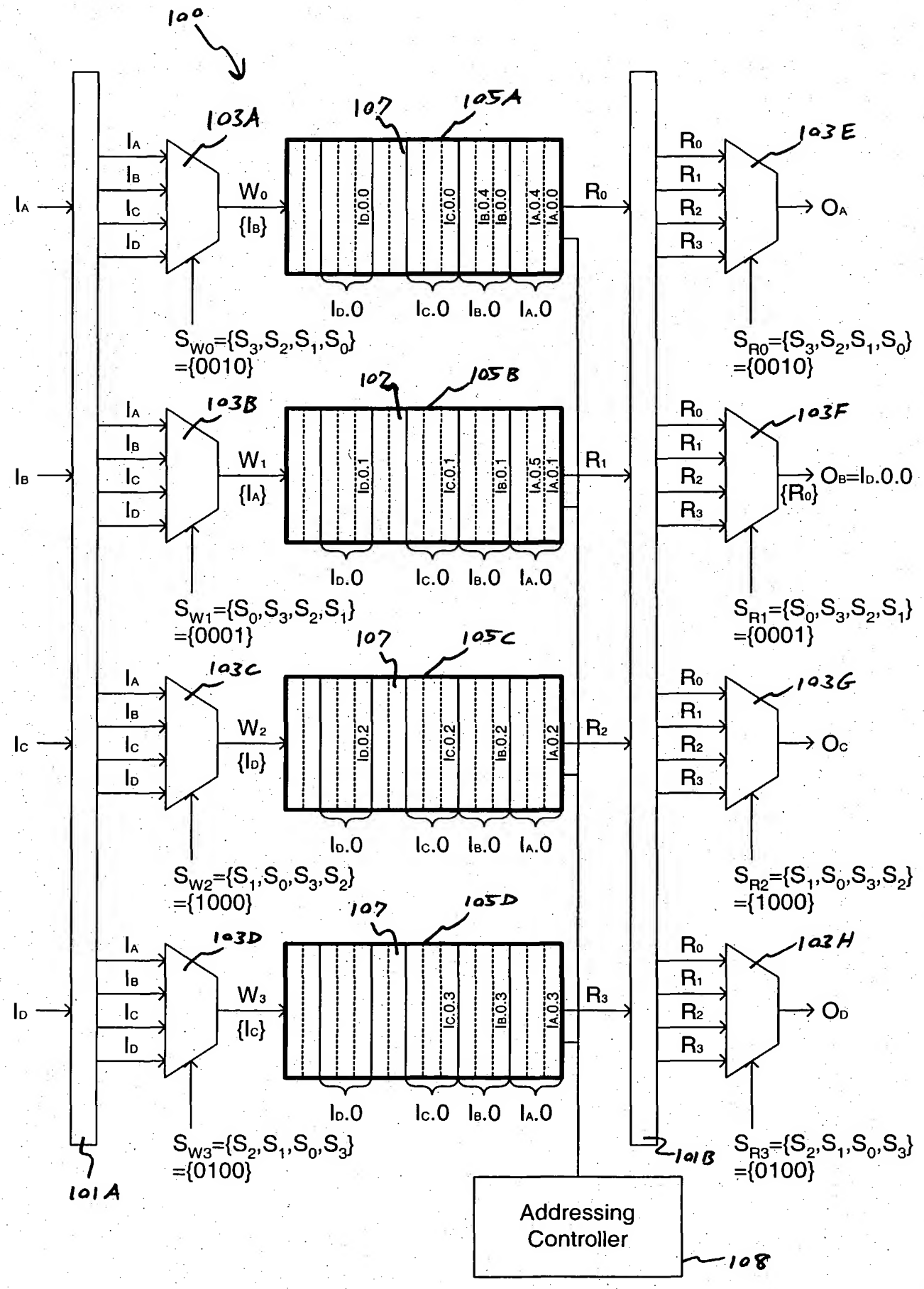
100
103A
103B
103C
103D
103E
103F
103G
103H
105A
105B
105C
105D
107
101A
101B
108
Addressing Controller
I_A
I_B
I_C
I_D
W_0 {I_B}
W_1 {I_A}
W_2 {I_D}
W_3 {I_C}
$I_{D.0.0}$ $I_{C.0.0}$ $I_{B.0.4}$ $I_{B.0.0}$ $I_{A.0.4}$ $I_{A.0.0}$
$I_{D.0.1}$ $I_{C.0.1}$ $I_{B.0.1}$ $I_{A.0.5}$ $I_{A.0.1}$
$I_{D.0.2}$ $I_{C.0.2}$ $I_{B.0.2}$ $I_{A.0.2}$
$I_{C.0.3}$ $I_{B.0.3}$ $I_{A.0.3}$
$I_{D.0}$ $I_{C.0}$ $I_{B.0}$ $I_{A.0}$
R_0 R_1 R_2 R_3
O_A
$O_B=I_{D.0.0}$ {R_0}
O_C
O_D
$S_{W0}=\{S_3,S_2,S_1,S_0\}=\{0010\}$
$S_{W1}=\{S_0,S_3,S_2,S_1\}=\{0001\}$
$S_{W2}=\{S_1,S_0,S_3,S_2\}=\{1000\}$
$S_{W3}=\{S_2,S_1,S_0,S_3\}=\{0100\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}=\{0010\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}=\{0001\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}=\{1000\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}=\{0100\}$

Fig. 9B

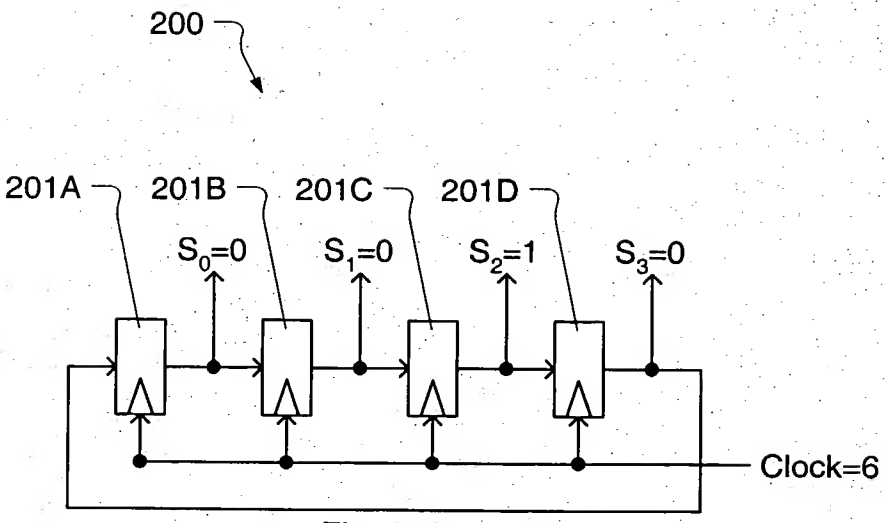

Fig. 10A

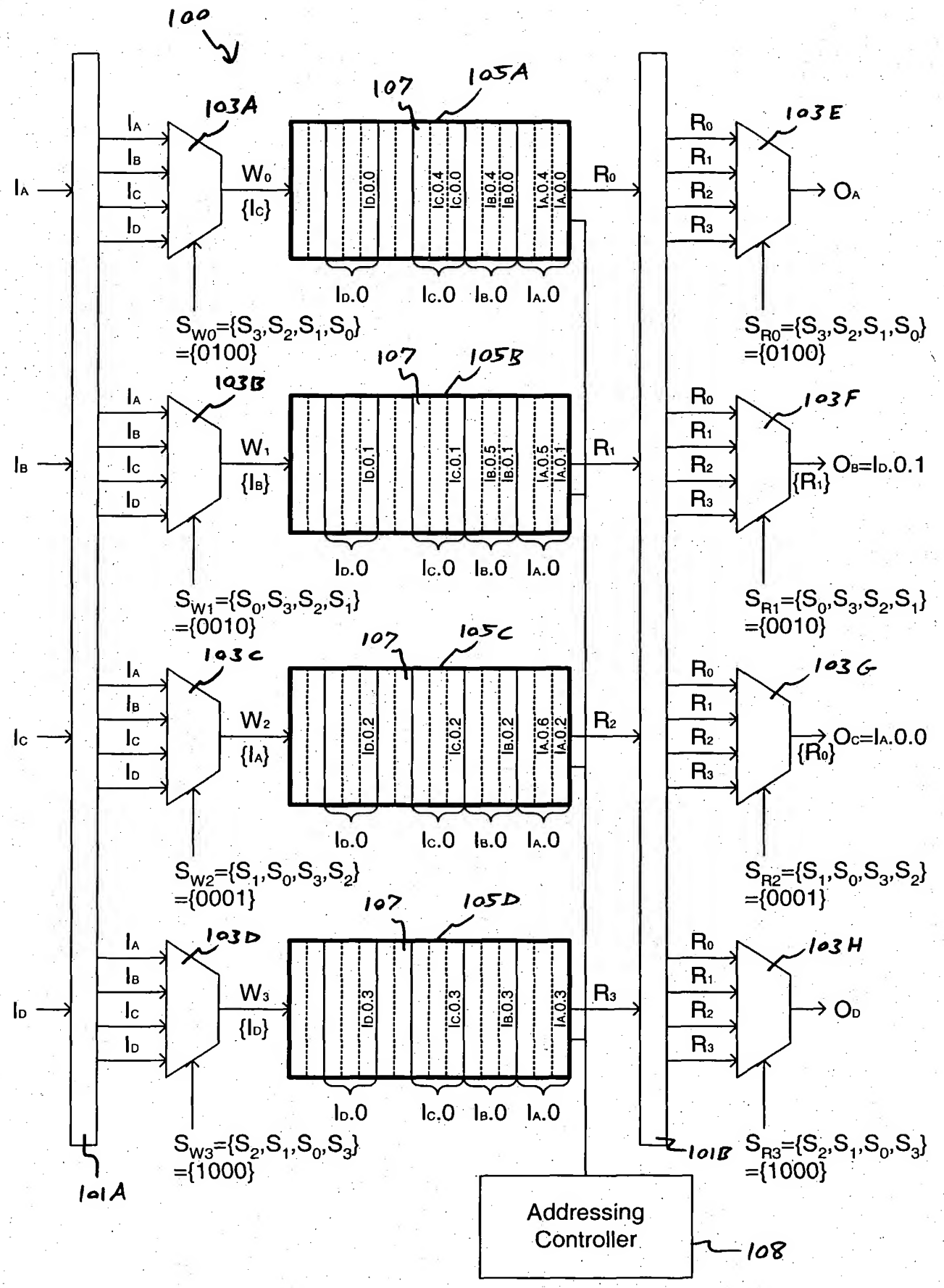
100
103A
103B
103C
103D
103E
103F
103G
103H
105A
105B
105C
105D
107
101A
101B
108
Addressing Controller
I_A
I_B
I_C
I_D
W_0 {I_C}
W_1 {I_B}
W_2 {I_A}
W_3 {I_D}
R_0
R_1
R_2
R_3
O_A
$O_B=I_D.0.1$ {R_1}
$O_C=I_A.0.0$ {R_0}
O_D
$I_D.0.0$ $I_C.0.4$ $I_C.0.0$ $I_B.0.4$ $I_B.0.0$ $I_A.0.4$ $I_A.0.0$
$I_D.0.1$ $I_C.0.1$ $I_B.0.5$ $I_B.0.1$ $I_A.0.5$ $I_A.0.1$
$I_D.0.2$ $I_C.0.2$ $I_B.0.2$ $I_A.0.6$ $I_A.0.2$
$I_D.0.3$ $I_C.0.3$ $I_B.0.3$ $I_A.0.3$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
$S_{W0}=\{S_3,S_2,S_1,S_0\}=\{0100\}$
$S_{W1}=\{S_0,S_3,S_2,S_1\}=\{0010\}$
$S_{W2}=\{S_1,S_0,S_3,S_2\}=\{0001\}$
$S_{W3}=\{S_2,S_1,S_0,S_3\}=\{1000\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}=\{0100\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}=\{0010\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}=\{0001\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}=\{1000\}$

Fig. 10B

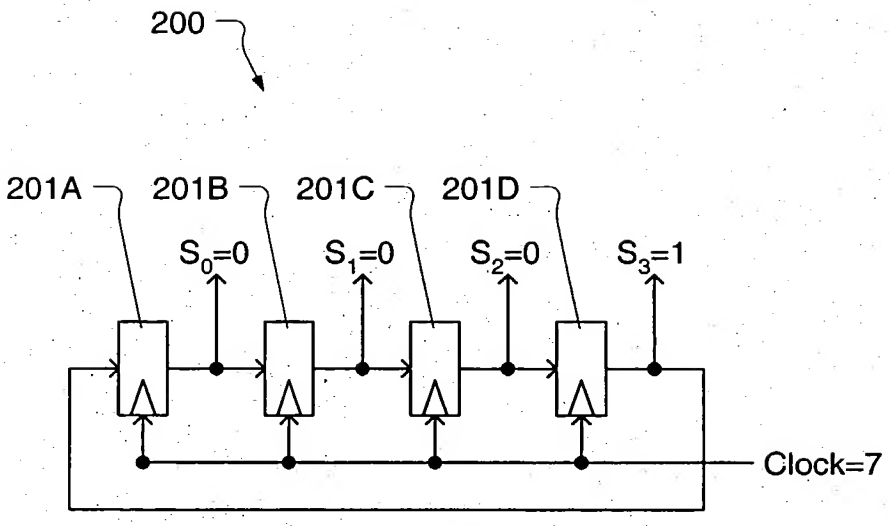

Fig. 11A

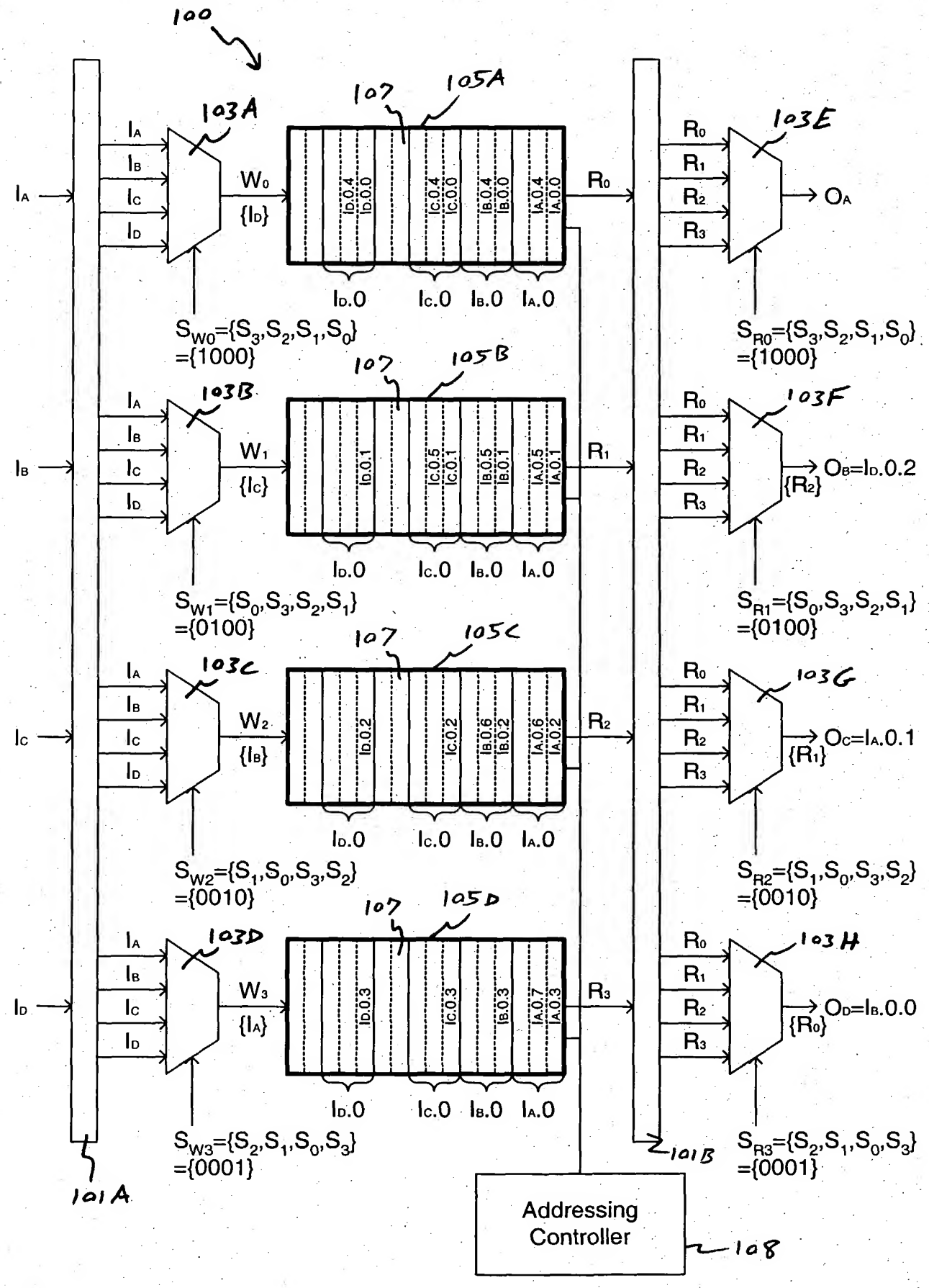
100
103A
105A
107
103E
103B
105B
103F
103C
105C
103G
103D
105D
103H
101A
101B
108
Addressing Controller
I_A
I_B
I_C
I_D
W_0 {I_D}
W_1 {I_C}
W_2 {I_B}
W_3 {I_A}
R_0
R_1
R_2
R_3
O_A
$O_B=I_D.0.2$ {R_2}
$O_C=I_A.0.1$ {R_1}
$O_D=I_B.0.0$ {R_0}
$I_D.0.4$ $I_D.0.0$ $I_C.0.4$ $I_C.0.0$ $I_B.0.4$ $I_B.0.0$ $I_A.0.4$ $I_A.0.0$
$I_D.0.1$ $I_C.0.5$ $I_C.0.1$ $I_B.0.5$ $I_B.0.1$ $I_A.0.5$ $I_A.0.1$
$I_D.0.2$ $I_C.0.2$ $I_B.0.6$ $I_B.0.2$ $I_A.0.6$ $I_A.0.2$
$I_D.0.3$ $I_C.0.3$ $I_B.0.3$ $I_A.0.7$ $I_A.0.3$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
$S_{W0}=\{S_3,S_2,S_1,S_0\}=\{1000\}$
$S_{W1}=\{S_0,S_3,S_2,S_1\}=\{0100\}$
$S_{W2}=\{S_1,S_0,S_3,S_2\}=\{0010\}$
$S_{W3}=\{S_2,S_1,S_0,S_3\}=\{0001\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}=\{1000\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}=\{0100\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}=\{0010\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}=\{0001\}$

Fig. 11B

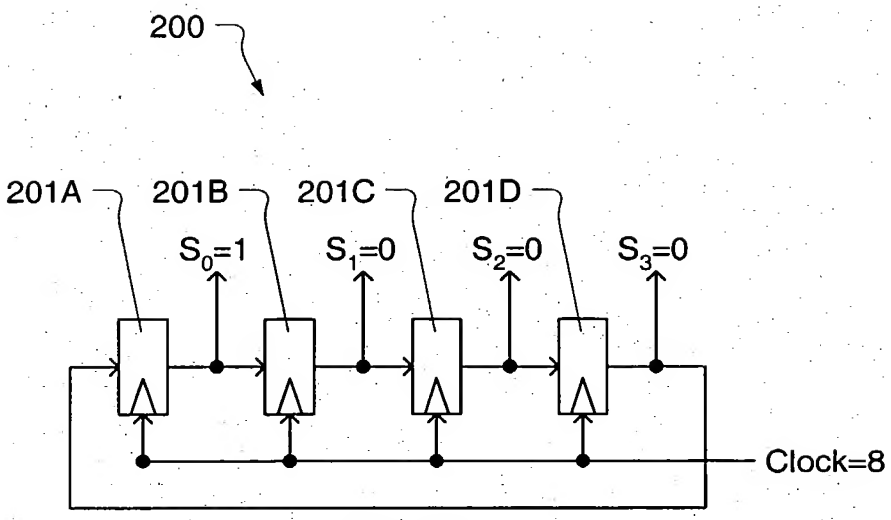

Fig. 12A

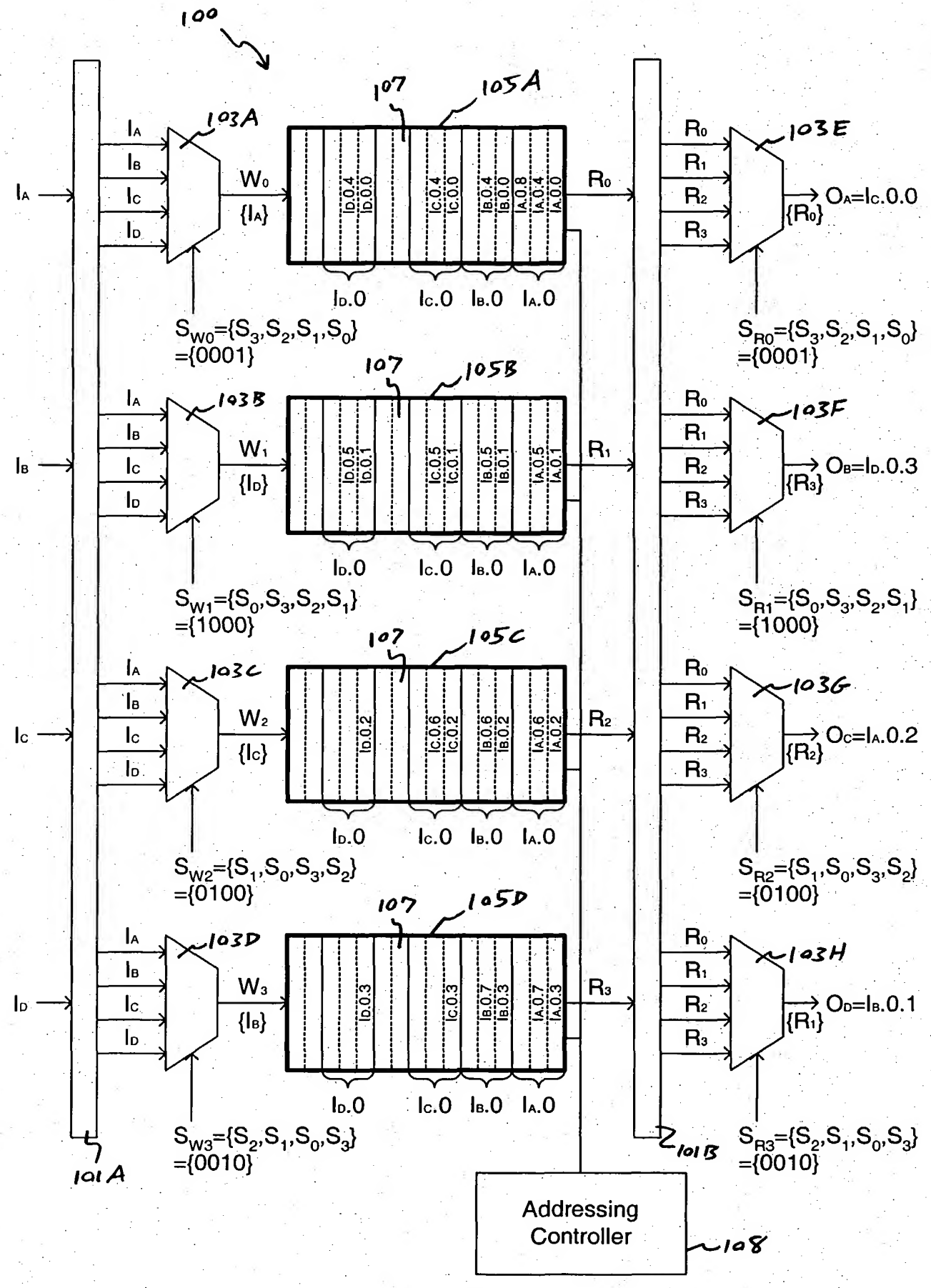
100
107
105A
103A
I_A
I_B
I_C
I_D
W_0
$\{I_A\}$
$I_D.0.4$ $I_D.0.0$ $I_C.0.4$ $I_C.0.0$ $I_B.0.4$ $I_B.0.0$ $I_A.0.8$ $I_A.0.4$ $I_A.0.0$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
$S_{W0}=\{S_3,S_2,S_1,S_0\}$
$=\{0001\}$
R_0
R_1
R_2
R_3
103E
$O_A=I_C.0.0$
$\{R_0\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}$
$=\{0001\}$
107
105B
103B
W_1
$\{I_D\}$
$I_D.0.5$ $I_D.0.1$ $I_C.0.5$ $I_C.0.1$ $I_B.0.5$ $I_B.0.1$ $I_A.0.5$ $I_A.0.1$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
$S_{W1}=\{S_0,S_3,S_2,S_1\}$
$=\{1000\}$
103F
$O_B=I_D.0.3$
$\{R_3\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}$
$=\{1000\}$
107
105C
103C
W_2
$\{I_C\}$
$I_D.0.2$ $I_C.0.6$ $I_C.0.2$ $I_B.0.6$ $I_B.0.2$ $I_A.0.6$ $I_A.0.2$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
$S_{W2}=\{S_1,S_0,S_3,S_2\}$
$=\{0100\}$
103G
$O_C=I_A.0.2$
$\{R_2\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}$
$=\{0100\}$
107
105D
103D
W_3
$\{I_B\}$
$I_D.0.3$ $I_C.0.3$ $I_B.0.7$ $I_B.0.3$ $I_A.0.7$ $I_A.0.3$
$I_D.0$ $I_C.0$ $I_B.0$ $I_A.0$
$S_{W3}=\{S_2,S_1,S_0,S_3\}$
$=\{0010\}$
103H
$O_D=I_B.0.1$
$\{R_1\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}$
$=\{0010\}$
101A
101B
Addressing Controller
108

Fig. 12B

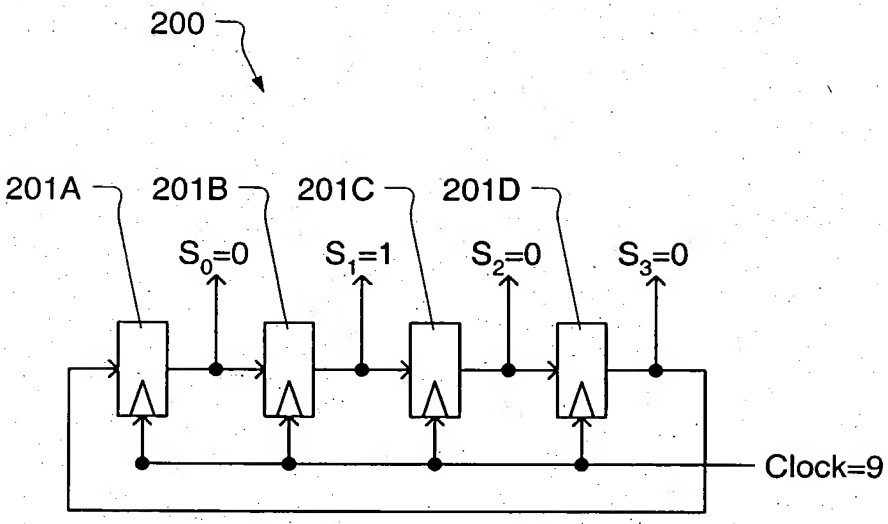

Fig. 13A

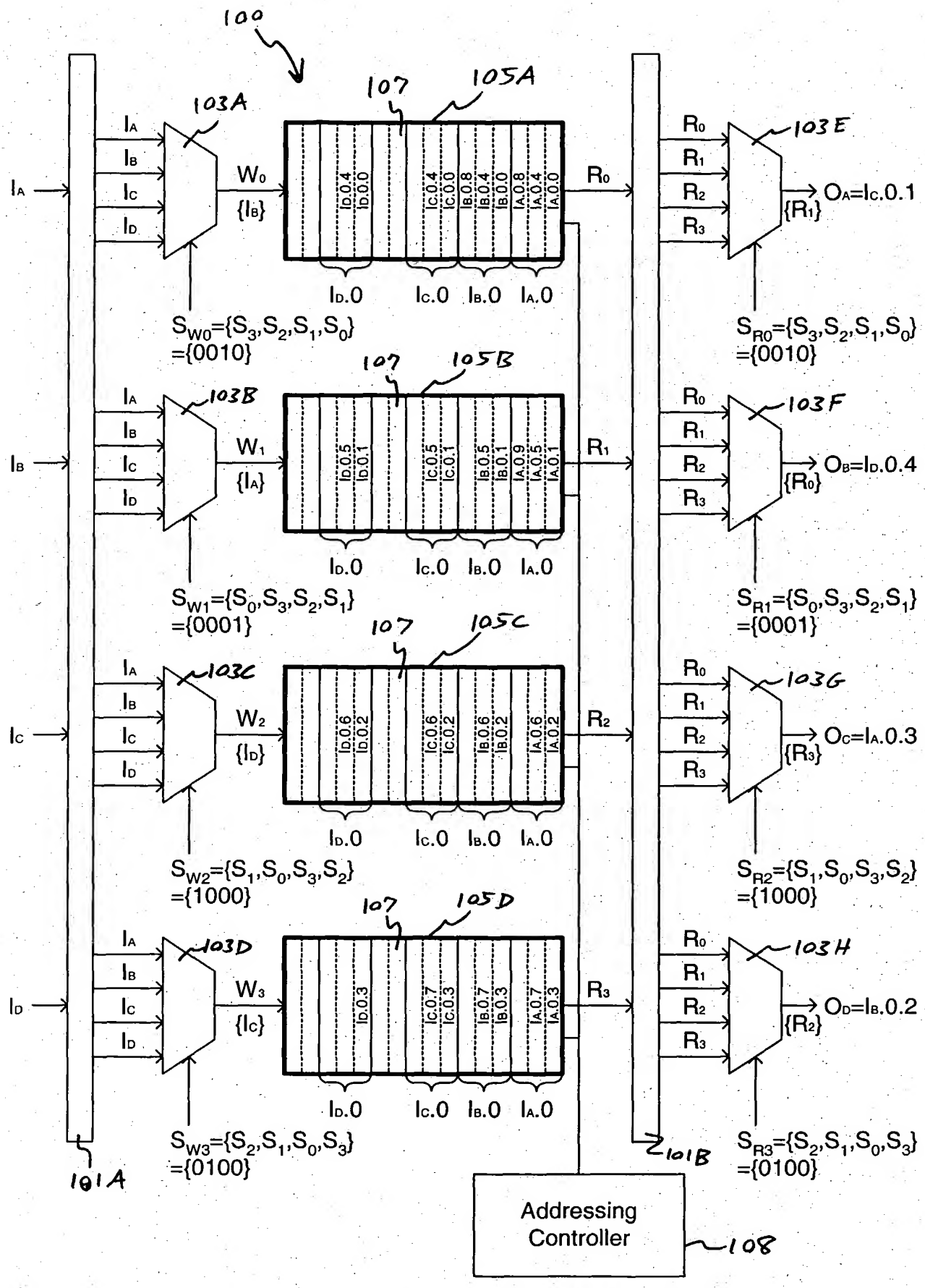
100
103A
107
105A
103E
103B
105B
103F
103C
105C
103G
103D
105D
103H
101A
101B
108
Addressing Controller
W_0 {I_B}
W_1 {I_A}
W_2 {I_D}
W_3 {I_C}
R_0
R_1
R_2
R_3
$O_A=I_C.0.1$ {R_1}
$O_B=I_D.0.4$ {R_0}
$O_C=I_A.0.3$ {R_3}
$O_D=I_B.0.2$ {R_2}
$S_{W0}=\{S_3,S_2,S_1,S_0\}=\{0010\}$
$S_{W1}=\{S_0,S_3,S_2,S_1\}=\{0001\}$
$S_{W2}=\{S_1,S_0,S_3,S_2\}=\{1000\}$
$S_{W3}=\{S_2,S_1,S_0,S_3\}=\{0100\}$
$S_{R0}=\{S_3,S_2,S_1,S_0\}=\{0010\}$
$S_{R1}=\{S_0,S_3,S_2,S_1\}=\{0001\}$
$S_{R2}=\{S_1,S_0,S_3,S_2\}=\{1000\}$
$S_{R3}=\{S_2,S_1,S_0,S_3\}=\{0100\}$

Fig. 13B

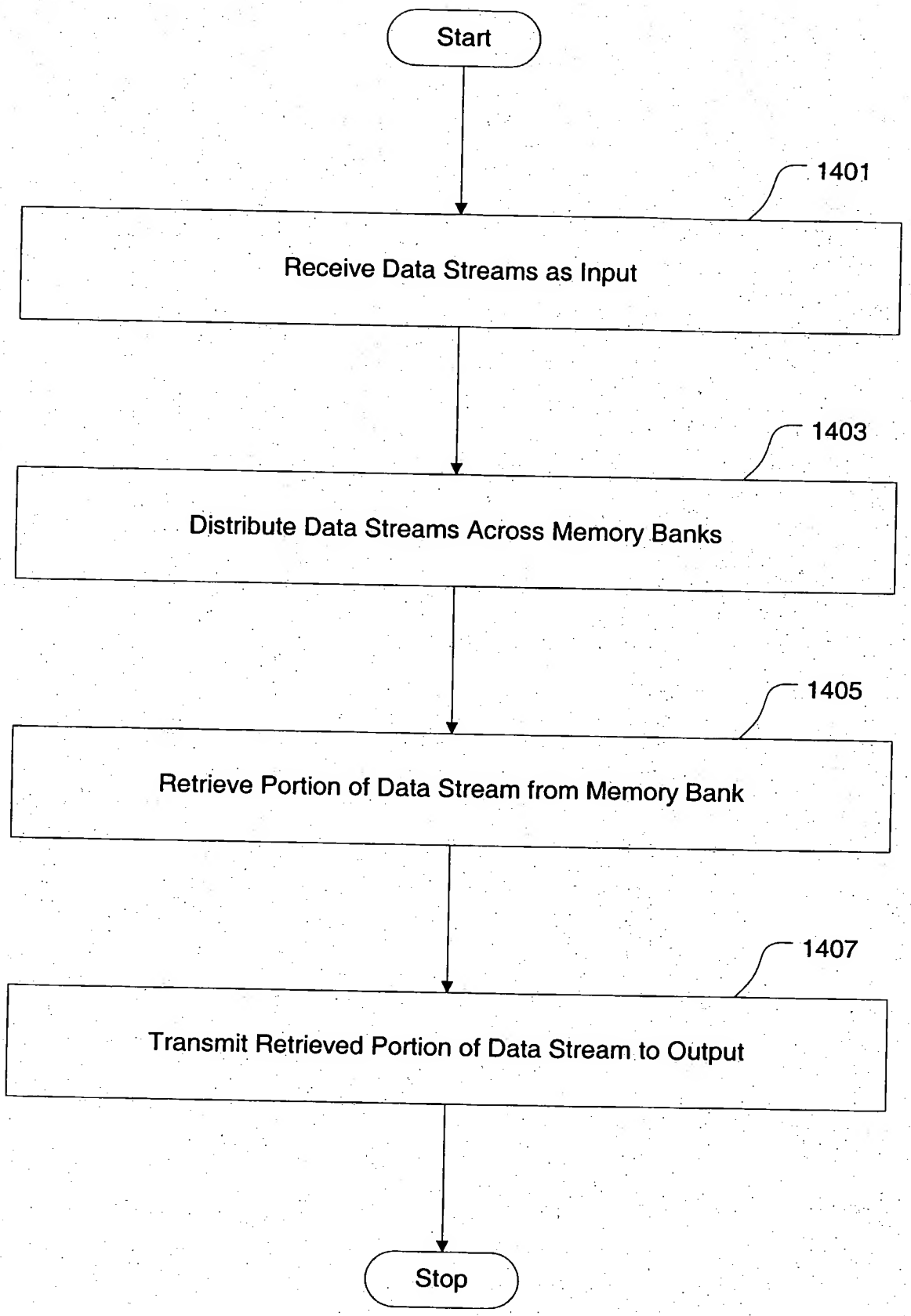
Start
1401
Receive Data Streams as Input
1403
Distribute Data Streams Across Memory Banks
1405
Retrieve Portion of Data Stream from Memory Bank
1407
Transmit Retrieved Portion of Data Stream to Output
Stop

Fig. 14